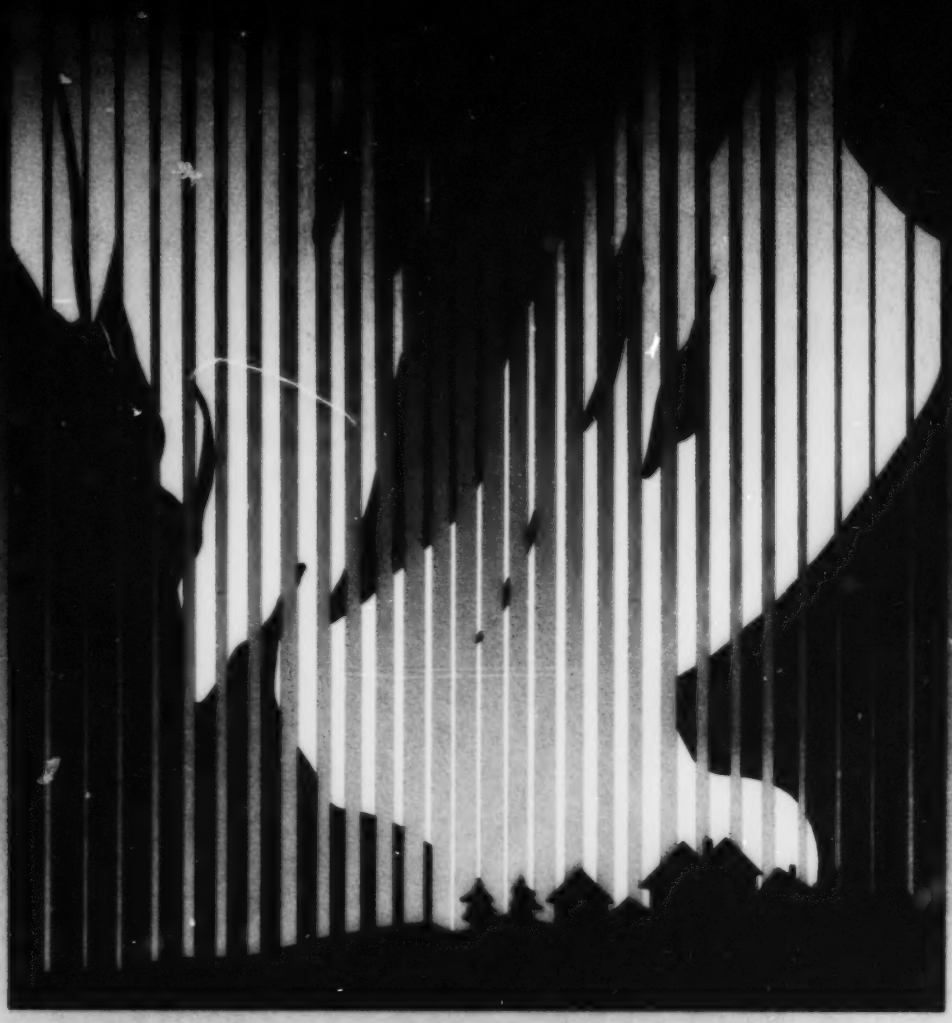

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Canada

FINAL REPORT

R-2000 BAND OFFICE OF THE HATCHET LAKE BAND,

WOLLASTON LAKE, SASKATCHEWAN

FINAL REPORT

R-2000 BAND OFFICE OF THE HATCHET LAKE BAND, WOLLASTON LAKE, SASKATCHEWAN

REMOTE COMMUNITY DEMONSTRATION PROGRAM OF

ENERGY, MINES AND RESOURCES CANADA

MARCH 1989

PREPARED FOR

THE HATCHET LAKE BAND, WOLLASTON LAKE, SASKATCHEWAN

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1988

Ce document est disponsible en français sous le titre suivant:
La récupération de la chaleur perdue dans les collectivités éloignées-des advantages pour tous.

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1.0 Executive Summary

Since Energy costs are very much higher in more northerly Canadian locations and represent a high percentage of the operating costs for Indian Bands, it was judged that Energy Efficient Construction practices should be demonstrated in the Remote Community Demonstration Program.

1.0 Sommaire Executif

Puisque les coûts d'énergies sont beaucoup plus élevés dans les régions du nord au Canada tel que les coûts d'opérations pour les communautés autochtones, une proposition a été faite; que les pratiques éfficaces de construction d'énergie soient démontrées dans le programme de démonstration dans les collectivités éloignées.

2.0 Introduction

Energy Conservation in the 1980's is a common and accepted target throughout North America. Its profile on various news media has been high and prominent.

The concept of "Energy Conservation" through Energy Efficient Building Techniques has been established and legitimized in southern locations in Canada, but not the North.

Energy, Mines and Resources Canada, through Phase I of the Remote Community Demonstration Program identified deficiencies in Northern Housing. These identified deficiencies prompted construction of the R-2000 Band Office, Wollaston Lake, as Phase II of the Remote Community Demonstration Program in Saskatchewan.

3.0 Goals

The major goal of the project was to construct an office building to optimum Energy Efficiency Standards, consistent with R-2000 guidelines, for the Hatchet Lake Band, Wollaston Lake, Saskatchewan.

Specific Objectives are as follows:

a) to reduce energy consumption in the new Band Office,

b) to monitor and evaluate the effectiveness of energy conservation measures incorporated into the construction,

c) to give Band members practical experience in energy efficient construction techniques, and the energy conserving operation of facilities, and

d) to transfer information on the results achieved to other remote communities, and agencies dealing with them.

4.0 Methodology

The project was split into three (3) stages.

4.1 Stage 1 - Construction

4.1.1 Objectives

The objective was to construct the office building to optimum energy efficiency standards, consistent with the R-2000 guidelines.

4.1.2 Responsibility

The Lac La Hache Indian Band, as Proponent, would co-ordinate the planning, design, and construction of the Project. Six (6) Band builders would be employed on the project, as part of a training program funded separately from this project.

4.1.3 Tasks

The Proponent would undertake to improve the energy efficiency of the Band office by installing the following material and equipment to meet the standards specified in this section:

1) Energy Performance - The structure would be built to use less than 28,266 equivalent kWh annually, as simulated by the HOT 2000 computer program. See Appendix A.

ii) Insulation - The attic would be insulated to R60; the walls to R27.5; the grade beam to R27.5; the foundation exterior to R15; and domestic hot water pipes would be insulated.

iii) Mechanical Systems - The furnace would include a retention head oil burner and a stack damper. A heat recovery ventilator used for ventilation must provide 0.4 air change per hour of continuous ventilation or a minimum 50 litres per second, whichever is greater.

iv) Air/vapour Barrier - The air/vapour barrier would be installed in a manner that ensures 1.5 air changes per hour at a pressure differential of 50 Pascals. This would be confirmed with a fan de-pressurization test.

v) Windows - Triple pane windows with wood frames would be installed.

vi) Vestibule - A vestibule would be constructed at the main entrance to provide an airlock.

vii) Doors - Insulated wood or metal exterior doors would be installed.

viii) Lighting - Energy efficient florescent tubes and

ballasts would be installed.

ix) Set Back Thermostats - Battery-operated set back thermostats would be used.

x) Instrumentation - A flow meter on the oil line and an electrical consumption meter on the domestic hot water tank would be installed.

4.2 Stage 2 - Monitoring

4.2.1 Objective

The objective of the monitoring program was to measure the performance of the building's energy features. This would be achieved by evaluating the energy consumption and user's satisfaction with the office.

4.2.2 Tasks

The monitoring tasks to be undertaken are shown below.

1) Construction techniques would be monitored by Energy, Mines and Resources Canada during critical periods of construction including installation of the air/vapour barrier. This activity would include the interim site inspection required under R-2000. Documentation would include slides and the interim inspection report.

ii) The Heat Recovery Ventilator would be installed by a contractor retained by the Proponent and approved under the R-2000 program.

iii) The air leakage test would be conducted by a Technical Officer from the Conservation and Renewable Energy Office, Saskatoon, using equipment loaned by the National Research Council's Division of Building Research in Saskatoon. A copy of the test results would be provided to the Proponent.

iv) The following equipment and services would be purchased by the Proponent.

a) - one fuel flow meter for the oil furnace

b) - one electrical consumption meter for the domestic hot water

c) - one radon pump and laboratory analysis of results

d) - one formaldehyde monitoring device and laboratory analysis of results

e) - one package of smoke pencils

Energy, Mines and Resources Canada would perform the <u>final site inspection</u> following occupation and after the heating season commenced and would include the following monitoring as required by the R-2000 program:

i) Indoor humidity levels would be measured using a sling psychrometer.

ii) User interviews would be conducted.

iii) A technical verification would confirm the existence of energy saving features.

iv) The Heat Recovery Ventilator would be tested for air flow, efficiency and balance following the procedure developed by the R-2000 program.

v) Backdraft tests would be conducted on the stack damper of the oil furnace.

vi) Radon monitoring pumps would be installed.

vii) Formaldehyde monitoring badges would be installed.

viii) The foundation would be marked to check for future movement.

A local monitoring assistant would be retained for approximately 18 hours over 12 months to perform selected tasks. Energy, Mines and Resources Canada would instruct the assistant in the completion of these tasks. They are:

- forward radon pumps and formaldehyde badges to Energy, Mines and Resources Canada one (1) week after installation;

- provide data and other relevant information to Energy, Mines and Resources Canada on a monthly basis.

4.2.3 Reporting

The following would be included in the twelve (12) monthly monitoring reports supplied to Energy, Mines and Resources Canada by the local monitoring assistant:

a) Visual observations of condensation on windows, walls and ceilings, and mildew on any interior surfaces.

b) Records of fuel use as recorded by an inside flow meter on the oil line to the furnace.

c) Records of electrical consumption for hot water heating as recorded by the separate meter installed on the tank.

d) Comments on user concerns, including comfort and convenience.

4.3 Stage 3 - Information Transfer

4.3.1 Objectives

To encourage other low energy institutional construction or retrofit initiatives in northern and native communities.

4.3.2 Responsibility

Information transfer would be done by the Lac La Hache Indian Band and Energy, Mines and Resources Canada. Other agencies could be asked to undertake information transfer activities.

4.3.3 Tasks

The information transfer plan would consist of;

i) project summaries in a format to be provided by Energy, Mines and Resources Canada.

ii) News coverage - The Band would inform news media serving northern Saskatchewan, such as Keewatin Country (CBC Radio, La Ronge), The Northerner newspaper (La Ronge), the Meadow Lake Sun newspaper (Meadow Lake) and the native media (New Breed, Update, Saskatchewan Indian) of the completion of construction and provide interviews or information as requested by the media. The Band would also release monitoring results to the media one year later.

iii) Workshop - During the final inspection visit the CREO Technical Officer would deliver a half-day workshop for Band personnel working in and/or maintaining the Band Office. He would describe the R-2000 concept and theoretical benefits available. Discussion topics would include air vapour barriers, heat recovery ventilators, heating, doors and windows, lights and hot water.

iv) Slides - Energy, Mines and Resources Canada would provide the Proponent with one complete set of slides taken before, during and after construction, and with a simple text.

v) The Final Report - The Proponent would arrange for a professional, approved by the Minister, to prepare a final report which would include as a minimum, summaries of all information contained in other reports.

vi) Report Dissemination and Slide Presentation - The Band would transfer information to other Bands in the Prince Albert District (Northern Saskatchewan), and to Indian and Northern Affairs Canada by sending reports and showing the slide presentation.

Energy, Mines and Resources Canada would make information available to other agencies responsible for institutional

buildings in northern Saskatchewan, as identified in the RCDP Phase I Institutional Study (RCDP-78).

These activities would include, but not be limited to:

- Presentations to officials responsible for property management and development in the subject agencies, and

- Distribution of project reports to the officials in these agencies.

5.0 Results

5.1 Stage I - Construction

5.1.1 Objectives

The basic objective of constructing the office building to optimum energy efficiency standards, consistent with the R-2000 guidelines has been met.

5.1.2 Responsibility

The Hatchet Lake Band coordinated the planning, design and construction of the project. More than six Band builders were employed and trained on the project.

5.1.3 Tasks

1) <u>Energy Performance</u>

The structure has not yet been occupied for one full year and so annual electrical use has not been established.

ii) Insulation

The attic was insulated to R60, as specified. The exterior walls were insulated to R29.5 as specified. The grade beam foundation was only insulated to R20 as the framing used was 2" x 6" rather than 2" x 8" as specified. This was because of the Band's inadvertent use of the 2" x 8" materials on another project. See Appendix B for site visit report.

iii) Mechanical Systems

Both furnaces include retention head oil burners and stack dampers. A heat recovery ventilator was installed and is functional.

iv) Air/Vapour Barrier

The air/vapour barrier was installed in a manner that ensures 1.5 A.C.H. (air changes an hour) at a pressure differential of 50 pascals. This was confirmed by fan depressurization test done by the E.M.R. Technical Officer. See Appendix C, Air Leakage Report.

v) Windows

Triple pane windows with wood frames were installed as per specifications.

vi) Vestibule

No vestibule was constructed at the main entrance to provide an airlock.

vii) Doors

Insulated metal doors were installed as specified.

viii) Lighting

Energy efficient florescent tubes and ballasts will be installed.

ix) Set Back Thermostats

Battery operated set back thermostats will be used.

x) Instrumentation

A flow meter on the oil line and an electrical consumption meter on the domestic hot water tank were installed.

Grand opening of the new Band Office took place on July 15, 1988.

5.2 Stage 2 - Monitoring

5.2.1 Objective

The objective of measuring the performance of the building's energy features by evaluating the energy

consumption and user's satisfaction has been done. See Appendix D for details.

5.2.2 Tasks

i) Construction techniques have been monitored by Energy, Mines and Resources Canada. Critical periods of construction such as installation of air/vapour barriers were overseen by E.M.R. staff. In fact, the E.M.R. Technical Officer played an integral role in the air/vapour barrier installation, spending three (3) days prior to air leakage testing assisting and instructing work crew.

ii) The Heat Recovery Ventilator was not installed by an R-2000 certified contractor but was inspected by E.M.R. and approved as an adequate installation.

iii) The air leakage test was conducted by a Technical Officer from E.M.R. See Appendix C for results.

iv) The following equipment and services were purchased by the Proponent:

   a) one fuel flow meter for the oil furnace. See Appendix E.

   b) One radon pump and analysis of results. See Appendix G.

c) One formaldehyde monitoring device and laboratory analysis of results. See Appendix F.

v) Energy, Mines and Resources Canada performed the final site inspection following occupation after the heating season had commenced, including the following monitoring as required by the R-2000 program.

a) Indoor humidity levels were measured using a sling psychrometer. See Appendix H, Air Quality Report.

b) User interviews were conducted. See Appendix H, Homeowner Survey.

c) A technical verification to confirm existence of energy saving features was done. See Appendix H, Technical Review.

d) The H.R.V. was tested for air flow, efficiency and balance following the procedure developed by the R-2000 program. See Appendix H, Technical Review.

e) Backdraft tests were conducted on the stack dampers of the oil furnaces.

f) Radon pumps were installed. See Appendix G.

g) Formaldehyde monitoring devices were installed. See Appendix F.

h) The foundation was marked for measurement of future movement.

vi) A local monitoring assistant completed the tasks of forwarding the radon pump and formaldehyde devices to E.M.R. one week after installation. He also supplied data and other relevant information to E.M.R. on a monthly basis.

5.3 Stage 3 - Information Transfer

5.3.1 Objectives

Encouragement was, and continues to be given for construction or retrofit initiatives in other northern and native communities.

5.3.2 Responsibility

Information transfer is being done by the Hatchet Lake Band and Energy, Mines and Resources Canada. Other agencies may be asked to undertake information transfer activities.

5.3.3 Tasks

i) Project summaries in a format provided by E.M.R. have

been provided. See Appendix I.

ii) The Band informed Northern news media of the completion of the project. The Band will also release monitoring results.

iii) During the final inspection and technical review visit, the E.M.R. Technical Officer delivered a half-day workshop for Band personnel. The R.C.D.P. Energy Efficiency in Remote Northern Housing slide presentation was used along with a complete set of the project slides.

iv) E.M.R. has provided the Proponent with one complete set of slides taken before, during and after construction.

v) The Proponent has prepared a Final Report.

vi) The Band is prepared to disseminate the Final Report and slide presentation to other Bands in the northern Saskatchewan region.
This is particularly opportune at this time since the Prince Albert District Chiefs Office (P.A.D.C.) has just proposed an "Energy Efficient Housing Project".

6.0 Conclusions and Recommendations

The main conclusions to be drawn are that R-2000 construction techniques are appropriate to northern housing and that the Hatchet Lake Band has acquired the skills to be able to build R-2000 standard homes on their reserve.

Some of the details which were not completed are as follows:

a) No vestibule/air lock in front of building

b) The foundation was not built as per original specifications and therefore does not have the designed insulation value.

c) The Heat Recovery Ventilation System was installed in conjunction with a forced air heating system which moves warm air downward into the heated crawl space and returns the cooler air via ductwork at the top of the units. This necessitates fresh air supply from the H.R.V. being introduced to the furnaces, in the furnace room, at an "eye level" height. No provision for this has been made. The H.R.V. simply dumps fresh air into the crawlspace. Also, the stale air pickups in the bathrooms do not function as they should since one bath is locked and neither have running water yet.

d) The oil flow meter for the heating system was installed on the exterior, has repeatedly frozen up and restricted flow

and has subsequently been removed.

e) The electrical sub-meter for the hot water system is redundant since no sewer and water are presently installed.

The fact that the project, as a whole, was delayed for nearly a full year explains most of the problems incurred. The position of Band Chief was occupied by a different person at the end of the delay. The actual work crew who started the project was not the same as that which finished it. The job foreman also changed.

Recommendations are as follows:

a) An exterior porch can be built later to accomodate the air lock vestibule concept.

b) The foundation exterior has yet to be backfilled and probably will not be until sewer and water service is installed. The backfill itself together with exterior insulation installed at the same time would create insulation levels comparable with original specifications.

c) The H.R.V. installation could be upgraded to distribute fresh air to the cold air returns of the furnaces. The two bathroom doors should be left open to facilitate stale air return to H.R.V. When sewer and water are present, this will no doubt become a reality.

The fact that radon levels in the crawl space were above the Canadian standard and that the H.R.V. has not been running continuously or even intermitantly suggest the requirement for remedial measures.

The most expedient method would be to ventilate the crawlspace until sewer and water are installed. This could be accomplished by first, running the H.R.V. continuously; and second, allowing the H.R.V. to pick up stale air in the basement as well as the main floor. Also, the crawlspace trap door cuold be left open.

d) The oil flow meter should be installed on the main oil line in the heated crawl space. This would mean more accurate fuel measurements and no freezing of the line.

e) The electrical sub meter for the domestic hot water will only be useful when the sewer and water system is in place.

After all is complete with the project, since sewer and water should be present within two years, another air quality check should be performed and energy analysis done.

7.0 References and Acknowledgements

The authors of this report would like to thank Energy, Mines and Resources Canada and Indian and Northern Affairs Canada for their invaluable assistance in the realization of this project.

8.0 APPENDICES

APPENDIX A

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* * * * * * * * * * * * * * * * * * * * * * * *
*                                               *
*                   HOTCAN!                     *
*  NATIONAL RESEARCH COUNCIL OF CANADA          *
*     DIVISION OF BUILDING RESEARCH             *
*     SASKATOON, SASKATCHEWAN, 1982             *
*          (RELEASE HOTCAN 4.01)                *
*                                               *
* * * * * * * * * * * * * * * * * * * * * * * *

CLIENT NAME: BAND OFFICE
ADDRESS    : WOLLASTON POST

USER DATA FILE NAME: BAND-2,2

DATA IS FOR URANIUM CITY
```

*** BUILDING PARAMETERS ***

ELEMENTS	HOUSE VOLUME	AIR CHANGE	HT LOSS W/DEGC	% SEASONAL HT LOSS
VENTILATION	23425 FT3	.16/HR	32.74	22.91
	AREA FT2	R VALUE FT2-DEGC/W		
CEILING	1849.00	60.00		
TOTAL	1849.00	60.00	16.26	11.38
MAIN WALLS	1620.00	27.50		
TOTAL	1620.00	27.50	31.09	21.75
DOORS	63.00	15.00		
TOTAL	63.00	15.00	2.22	1.55
BASEMENT A2.6D	300.12	27.50		
TOTAL	300.12	27.50	5.76	4.03
BASEMENT 2FT	172.00	27.50		
TOTAL	172.00	27.50	2.85	1.99
BASE. TO FLOOR	1.72	27.50		
TOTAL	1.72	27.50	.40	.27
FLOOR PERIMETER	480.00	15.00		
TOTAL	480.00	15.00	10.04	4.25
FLOOR CENTRE	469.00	15.00		
	900.00	.00		
TOTAL	1369.00	1.60	29.58	13.57
SOUTH WINDOWS	58.00	3.18		
TOTAL	58.00	3.18	9.61	6.73
NORTH WINDOWS	87.00	3.18		
TOTAL	87.00	3.18	14.42	10.09
WEST WINDOWS	29.00	3.18		
TOTAL	29.00	3.18	4.81	3.36

:

OTCAN

-EAST WINDOWS	.00	.00		
TOTAL	.00	.00	.00	.00
-WEST WINDOWS	.00	.00		
TOTAL	.00	.00	.00	.00

DDRESS : WOLLASTON POST

ESIGN HEAT LOSS AT -44C = 8.26 KW
EGREE DAYS FOR URANIUM CITY IS 8210
EMPERATURES (DEG C) MAIN FLOOR = 21 BASEMENT = 18
ENSIBLE HEAT GAIN FROM PEOPLE (KWH/D) = 3.2
AILY BASE ELECTRIC CONSUMPTION (KWH/D) = 7
AILY HOT WATER ENERGY CONSUMPTION (KWH/D) = 7
ASE LEVEL CHOSEN IS (A)
ASEMENT INSULATED PRIMARILY FROM THE INSIDE
INDOW SHADING COEFFICIENTS: SOUTH = .71 NORTH = .71
EAST = .71 WEST = 0
S-EAST = 0 S-WEST = 0
OUTH OVERHANG GEOMETRY: AVERAGE WINDOW HEIGHT = 4 FT
AVERAGE OVERHANG WIDTH = 2 FT
AVERAGE HEIGHT ABOVE WINDOW = 1 FT
TURAL INFILTRATION RATE (AC/HR) = 0
ORCED VENTILATION RATE (AC/HR) = .4
AT RECOVERY EFFECTIVENESS ON VENTILATION AIR = 60 %

*** MONTHLY SUMMARY OF ENERGY CONSUMPTION ***

NTH	THERMAL LOAD KWH/D	MONTHLY SOLAR FRAC	AUX HEAT REQ KWH/D	TOT CONS KWH/D
N	138.19	.07	127.96	141.96
B	125.51	.15	106.72	120.72
R	106.30	.25	79.25	93.25
P	71.48	.34	47.08	61.08
Y	43.51	.49	22.23	36.23
N	23.62	.73	6.31	20.31
L	15.13	.88	1.86	15.86
G	18.84	.84	3.83	17.83
S	38.89	.38	24.20	38.20
T	57.71	.19	47.28	61.28
V	91.59	.08	84.47	98.47
C	121.57	.05	115.33	129.33

*** YEARLY ENERGY CONSUMPTION COMPARISONS ***

MONTH HEATING SEASON IN EFFECT
UAL SOLAR HEATING CONTRIBUTION = 22 %

IMATED ANNUAL SPACE HEATING 73 GJ, OR 20,183 MWHRS
H PROGRAM ENERGY BUDGET FOR SPACE [illegible] = [illegible] MWHRS

DICTED ANNUAL AUXILIARY ENERGY CONSUMPTION = 5,110 MWHRS
H PROGRAM AUXILIARY ENERGY CONSUMPTION = 10,400 MWHRS

*** ANNUAL PREDICTED FUEL COSTS ***

FUEL COSTS ARE FOR SASKATCHEWAN AS OF 93/03/07

ENERGY SOURCE	COST PER UNIT	SPACE HEATING	HOT WATER	LIGHTS AND APPLIANCES
OIL	28.9¢/LITRE	$ 768.11/YR EFF.= 70%	$ 123.93/YR EFF.= 55%	--

****

This estimate of energy demand may not reflect actual energy requirements of a house due to variations in weather, performance of equipment, and the lifestyle of the occupants.

****

APPENDIX B

HOME DATA / SITE VISIT REPORT

Canadian Home Builders' Association
Association canadienne des constructeurs d'habitations
R-2000

Inspected By:	Inspected By:
Doug Mitchell	Doug Mitchell

Builder details

Company name: LNC LA ROCHE BROS
Address: WOLLASTON LAKE
City:
Province: SASK. Postal Code:
Telephone: 633-2007
Contact: ED BENOANIE
R-2000 House No.:

Home details

Lot #: Plan #:
Home Address:
City: WOLLASTON LAKE
Province: SASK Postal Code:
Planned start date:
Planned completion date:

		INSP. 1 Date: 23/09/86	INSP. 2 Date: 3/12/87	COMMENTS / NOTES (Use reverse if necessary)
1	Home type: BUNGALOW	✓		- 4 FT CRAWL SPACE
	Storeys: ONE	✓		
	m² or ft²: 167.8 m2	✓		
2	Attached garage: NONE			
	m² or ft²:			
	heating:			
3	Other attached areas:			
	heating:			
4	South side sun obstruction: 000 %	✓		
5	Windows and Glazings:			
	South window area ____ m² or ft² ____ glazings	✓		
	North window area ____ m² or ft² ____ glazings	✓		
	East window area ____ m² or ft² ____ glazings	✓		
	West window area ____ m² or ft² ____ glazings	✓		
6	R-Values: walls 27.5	✓	✓	
	ceilings 60			- NOT IN PLACE AT TIME OF INSPECTION
	basement 20	✓	✓	- SPECS SAY R 29.5 BUT R20 DUE TO 2"x6" WITH OUT 1½" STYROFOAM
	slab			
7	Fireplace type:			
	Chimney type:			
8	Heating system			
	1) manufacturer: CLAIR model: 100 OS		✓	
	2) manufacturer: CLAIR model: 100 OS		✓	
9	Ventilation equipment			
	1) manufacturer: VANEE model: 2000ZD		✓	- SPECS SAY 2 HRVS BUT ONLY 1 PRESENT
	2) manufacturer: model:			
10	Equipment requiring make-up air supply:			
	1) requiring L/s or cfm			
	2) requiring L/s or cfm			
11	Outside combustion air intake: 1) 15.24 cm. diameter		✓	
	2) 15.24 cm. diameter		✓	
12	Domestic hot water heater		✓	
	1) manufacturer: model:			
	2) manufacturer: model:			
13	Active solar system:			
	Heat transfer medium:			
14	Heat pump type:			
	manufacturer: model:			
15	Other notable features (eg. Fiberglas Can. System, ADA System)			
	- 2"x6" FRAMING ON UPPER EXTERIOR WALLS WITH 1½" STYROFOAM	✓	✓	- PLANS SHOW EXTERIOR OF GRADE BEAM WITH 1½" STYROFOAM BUT NOT THERE

APPENDIX C

Standard Air Leakage Test Report

Canadian Home Builders' Association
Association canadienne des constructeurs d'habitations
R-2000

ARC LTD MACHINE SHOP
Builder/Company Name
WOLLASTON LAKE
Address
City
SASK
Province
EQUIPMENT MANUFACTURER MINNEAPOLIS
TYPE OF EQUIPMENT BLOWER DOOR

WOLLASTON LAKE
Home Address
City
SASK
Province
R-2000 House No.

DATE OF TEST: DEC 2/87 TIME OF TEST: 3:00 PM
OUTDOOR TEMPERATURE: -15 °C
BAROMETRIC PRESSURE:
WINDSPEED: 15 MPH DIRECTION: FROM NW VARIABILITY: STEADY
BUILDING FLOOR AREA (including basement) m^2
167.8 m^2
BUILDING ENVELOPE AREA (including basement) (from Hot-2000 data sheet) (for Normalized Leakage Area) m^2
1302 m^2
TYPE OF HOME (bungalow,two storey,etc.)
BUNGALOW
SPECIAL FEATURES (cathedral ceilings,etc.)
4 BY. CRAWL SPACE

FLOW MEASURING TECHNIQUE - NOZZLE - 1 ☐ FAN SPEED -2 ☑ ORIFICE - 3 ☐
CALIBRATON ——— l/s to ——— l/s
TYPE OF OURDOOR PRESSURE TAP SYSTEM USED FOUR WALL - 1 ☑ REMOTE - 2
DOES EQUIPMENT AUTOMATICALLY CALCULATE "CORRECTED DATA"? YES ☐ NO ☑

MEASURED DATA*				CORRECTED DATA	
ΔPm(Pa)	Fan Speed RPM or P(Pa)	Qm(L/S)	t(°C)	P(Pa)	Q(L/S)
60	110				
50	100				
40	85				
30	55				
20	30				
10	15				

ΔPO= _____ (Beginning of Test) ΔPO= _____ (End of Test)

* Note: Readings must be taken at 6 points, at a minimum of 5 Pa intervals, and within the range of 10 Pa to 60Pa. When equipment automatically calculates "Corrected Data" the "Measured Data" section need not be completed if the calculation method is separately filed and verified with the listing agency by The Testing Company.

CALCULATED DATA

C _____ L/(s X Pa)
n _____ (between 0.5 and 1.0)
r _____ (greater than 0.99)
Q_{10} _____ (L/s)
Q_{50} _____ (L/s)
_____ % Relative Standard Error of Q_{50} (less than 5%)

ACH @ 50PA = 1.5 ACH

_____ NLA @ 10 Pa

_____ ELA @ 10 Pa.

EAA
Company name
706 119 AVE NUE S
Address
SASKATOON SASK
City Province
Testing Firm No.

I hereby certify that this test has been performed in accordance with the R2000 Air Leakage Test Guidelines.

ADAM MACHAEL
Technician Name (print)
Signature
Date of this Report 02 DEC 87

APPENDIX D

MONTHLY MONITORING REPORT

- R2000 Band Office, Wollaston Lake
- Date:

1. Visual Observations:

   - Is there any condensation (water) on the windows, walls, or ceilings?

   - Is there mildew or water stains on any of the interior surfaces?

2. Record of Fuel Use:

   - What is the reading on the flow meter installed on the oil line to furnaces?

3. Record of Electrical Consumption:

   - What is the reading on the separate meter installed on the hot water tank?

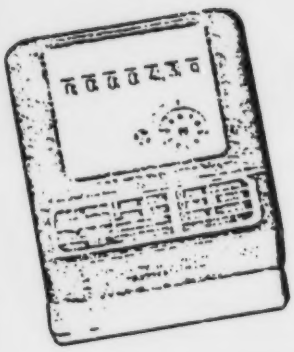
   - What is the reading on the main electrical meter?

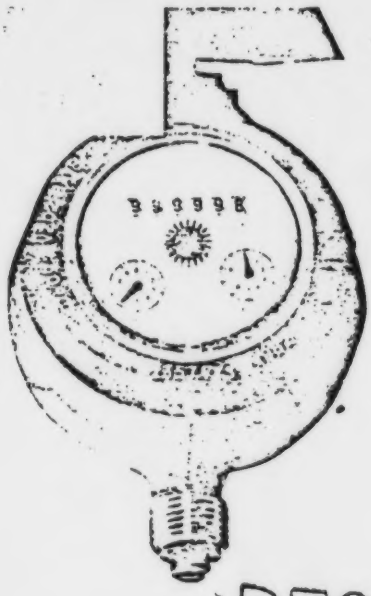
4. User comments:

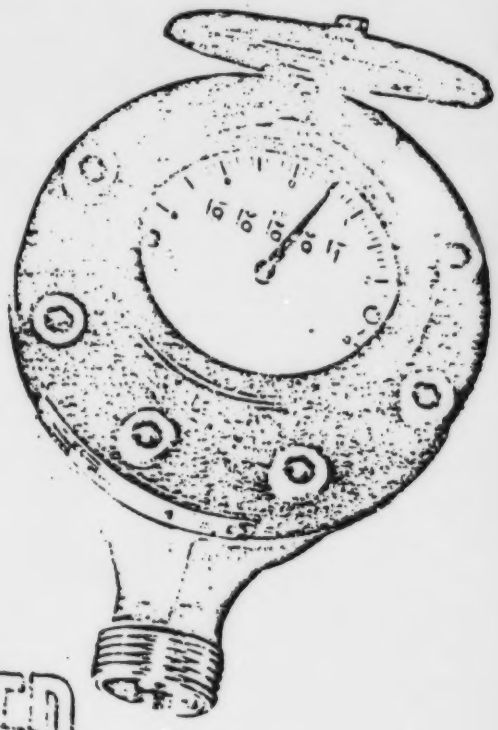
   - Are there any user concerns regarding comfort, convenience, etc?

APPENDIX E

neptune 1/8", 3/8" and 3/4" VLF METERS
for low flow







VLF4 (⅛")

VLF8 (⅜")

VLF20 (¾")

RECEIVED
JUN 17 1983

The Neptune line of VLF Low Flow Meters is designed to measure light fuel oil or diesel oil. Offered in three sizes, 1/8", 3/8", and 3/4", flow can be measured at rates from .25 to 390 gph. Accuracy is ± 1%; repeatability, ± 1/4%.

The oscillating piston of these meters forms two measuring chambers that are alternately filled and emptied. The passing oil is measured by fractions and immediately displaced. Even smallest flow quantities are registered by the meter.

The register unit of the VLF8 works accurately in a vacuum sealed casing. It is absolutely secured against dirt, dust and condensation.

Operation of the VLF4 and VLF8 can be supervised any time by checking the disc rotation in the dial center. This allows accurate monitoring and prompt adjustment of the burner. While the oil burner is in operation, the flow quantity can be determined and compared with the optimal adjustment within a few minutes, allowing full control of oil consumption.

The VLF meter can be mounted in any flow direction, but the dial must either face upwards or not more than 90° to one side.

Machined to close tolerances (±.0006), these precision instruments are particularly sensitive to foreign matter. There is a fine filter built into the inlet but, should the liquid being metered contain foreign matter, it is recommended that a screen or removable filter of appropriate size be fitted on the inlet side. The filter mesh should not be larger than 50 micron for the VLF4 and VLF8 meters, or 100 micron for the VLF20.

neptune / MEASUREMENT COMPANY

Emerald Road, Greenwood, SC 29646
(803) 223-1212

NEPTUNE INTERNATIONAL CORP., 30 Perimeter Park, Atlanta, GA 30341
NEPTUNE METERS LTD., 3526 Lakeshore Blvd. West, Toronto, Ont. M8W 1N7
NEPTUNE MEASUREMENT LTD., Oldham, England

SPECIFICATIONS

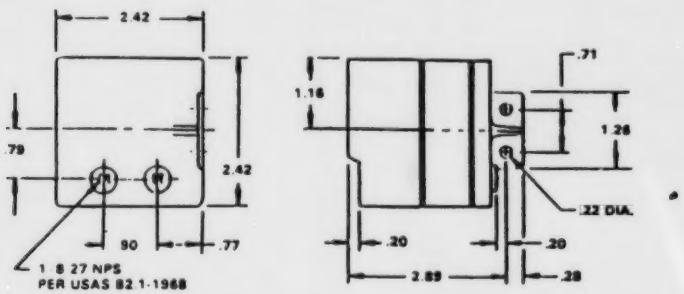
RATE OF FLOW
- 1/8"—.25 to 8 gph
- 3/8"— 1 to 40 gph
- 3/4"— 6 to 390 gph

OPERATING PRESSURE
- 1/8"—225 psi
- 3/8"—225 psi
- 3/4"—225 psi

OPERATING TEMPERATURE
- 1/8"—125°F
- 3/8"—140°F
- 3/4"—260°F

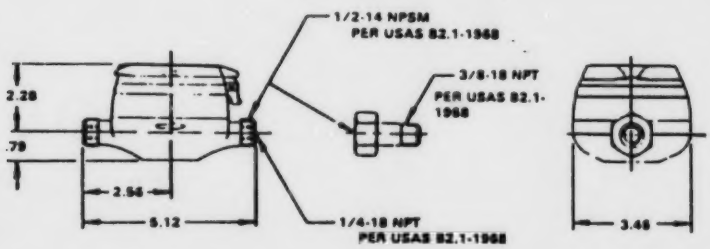
DIAL REGISTRATION
- 1/8"—increments to be .01 USG
- 3/8"—increments to be .01 USG
- 3/4"—increments to be .1 USG

DIMENSIONS
See outline drawings.



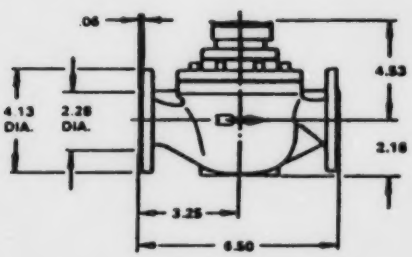
VLF4 (1/8")

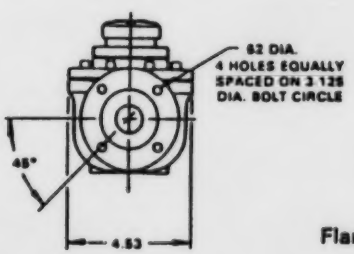
(All dimensions are in inches.)



VLF8 (3/8")

(All dimensions are in inches.)

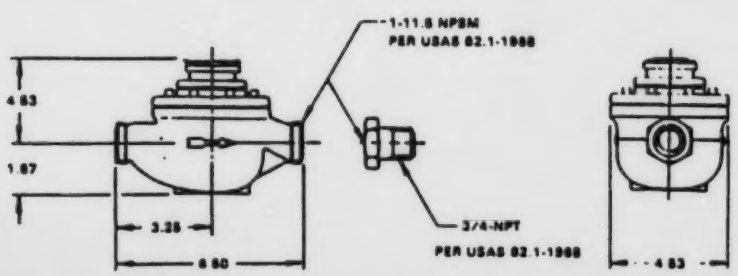




VLF20 (3/4")

(All dimensions are in inches.)

Flange connections



Threaded connections

APPENDIX F

CA9700-11-4

MAR 21 1989

ORTECH
INTERNATIONAL
2395 Speakman Drive
Mississauga, Ontario L5K 1B3
(416) 822-4111 (800) 268-5390
Telefax (416) 823-1446

March 16, 1989

Mr. R. Doug Mitcell
Energy, Mines & Resources
S.J. Cohen Building, Suite 706
119-4th Avenue South
Saskatoon, Saskatchewan
S7K 5X2

Dear Mr. Mitchell:

The results for the formaldehyde tests are as follows:

Location	Concentration of Formaldehyde
Wollaston Lake Band Office - Main Room	0.048 ppm
Wollaston Lake Band Office - Chief's Office	0.033 ppm
Mr. Willick - Saskatoon	0.012 ppm*
Mr. Willick - Saskatoon	0.018 ppm*

The concentrations of formaldehyde are given in parts of formaldehyde per million parts of air.

Health & Welfare Canada have set an indoor air quality guideline for formaldehyde at 0.10 ppm. All concentrations found at these locations were below this level.

Enclosed is an information sheet on formaldehyde which may be of interest to you.

.../2

* The formaldehyde samplers used for these locations had an expiry date of August 1987 and therefore, interferences may occur. Further sampling at the location should be performed with a new kit to confirm the results given.

60 Years of Service to Industry
ORTECH Corporation

Terms and conditions on reverse.

If you should have any questions concerning the results, please do not hesitate to call.

J. Collins
Occupational Health Section
Air Quality and Organic
Analysis Centre

P. Piersol, Manager
Occupational Health Section
Air Quality and Organic
Analysis Centre

JC/pm
Encl.

APPENDIX G

R.A.D. Service and Instruments Ltd.
50 Silver Star Blvd., Unit 206, Scarborough, Ont. M1V 3L3
Tel.: (416) 298-9200 and 298-9220
Fax: (416) 298-9220

February 25 1989

Mr. Doug Mitchell
CREO, EMR
S.J Cohen Building, Suite 706
119 4th Avenue South
Saskaton, Sask. S7K 5X2

MAR - 6 1989

Dear Mr. Mitchell,

Your file number: CR9700-11-4

The processing result for the R-2000 Band Office, Wollaston Lake is 0.11 in working level unit. Since our account with ORF has been closed, there will be no charge for this measurement.

Please send back the pumps as soon as possible. The pump speed needs a re-calibration. Thank you. Also, please contact me if further requirement of the M-1 unit is required.

The background of the detector which I just received indicates that the storage place may be above normal in radon level.

Yours truly,

H.L.Pai, Ph.D.
Presdient

APPENDIX H

Energy, Mines and Resources Canada
Super Energy Efficient Home Program

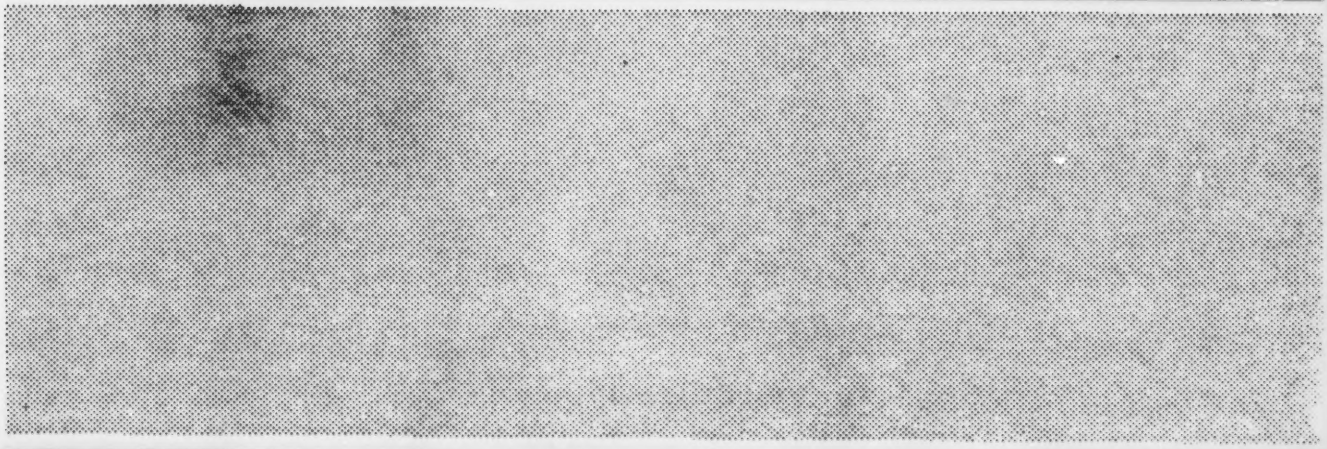
rgie, Mines et ..sources Canada
Programme de la maison à haut rendement énergétique

Hou. code

WOLLASTON LAKE
BAND OFFICE
THE HATCHET
LAKE BAND

R-2000

The Technical Review



Canada

Contents

Page	Section	Page	Section
1	Occupant Information	8	Domestic Hot Water System
1	Site Assessment	10	Ventilation System
2	Visual Assessment of the House	13	Ventilation Rates
3	Integrated Mechanical Systems	14	Ventilation System Continued
4	Space Heating System	18	Potential for Backdrafting Test
6	Cooling/Air Conditioning System	19	House Depressurization Test
7	Forced Air Distribution System	20	Energy Meter Specifications

FOR OFFICE USE

Occupant Information

001. Occupant Name: BANO (Surname), OFFICE (Initial) — 001 _____

Mailing Address:

002. Street: THE HATCHET LAKE BAND — 002 _____

003. City: MOOSE LAKE, SASK — 003 _____

004. Postal Code: S0T 3C0 — 004 _____

Telephone numbers of occupant(s):

Home: _____ _____

Work: 633 2003

Work: _____ _____
(Area Code) (Number)

FOR OFFICE USE

Site Assessment

006. What area is the house located in?

1 - urban core (high population density)
2 - suburban (medium population density)
3 - rural — 006 3

007. to 009. Do/could any of the following factors impact upon the air quality of the environment where the house is located?

1 - Main traffic thoroughfares
2 - Light industries
3 - Heavy industries (pulp & paper, oil refineries, steel mills, coal burning hydro, smelting, etc.) — 007 97
4 - High concentration of residential wood burning stoves — 008 _____
5 - Oceans, rivers, lakes
6 - Agricultural activities — 009 _____
97 - None of these factors
99 - Other _____

Comments: _____

_____

FOR OFFICE USE

Visual Assessment of the House

010. Do the following house features appear consistent with the HDF? Using the Comment Section, record any variations noted from the HDF information.

a) Orientation (compass required), House Dimensions, Elevation, Volume of House, General Floor Plans

b) Doors, Windows(area, spacing, reflective film, shutters etc.), Overhang details, Solar Obstruction (south, east, west -including trees)

Note: deciduous trees are not considered a solar obstruction since they loose their leaves in winter.

c) Other: Are the header areas and the attic hatch adequately sealed and insulated? Is the house experiencing truss uplift? Are there cracks which penetrate the drywall and/or foundation/slab, etc.? It should be noted that drywall cracks require special consideration in an "air tight drywall" house.

Comments: THE FOUNDATION IS PRESSURE TREATED 2" x 6" FRAME. THE ORIGINAL SPECS. CALLED FOR 2" x 8". ALSO, NO EXTERIOR STYRO FOAM IN PLACE.

012. What material is the subfloor made of?

-1 = N/A
1 = plywood
2 = Composition board
3 = Tongue & groove board
98 = Unable to determine
99 = Other _____

012 2

013. What percentage of the basement is finished "living" area?

_____ %

013 -1

Comments: CRAWL SPACE FOUNDATION, NO BASEMENT.

FOR OFFICE USE

Integrated Mechanical Systems

016. to 018. Indicate which, if any, of the Space Heating, Cooling, Ventilating &/or Domestic Hot Water (DHW) systems are integrated?

1 - Heating, Cooling
2 - Heating, Cooling, Ventilating
3 - Heating, Cooling, Ventilating & DHW
4 - Heating, Cooling, DHW

5 - Heating, Ventilating
6 - Heating, Ventilating, DHW
7 - Heating, DHW

8 - Cooling, Ventilating
9 - Cooling, Ventilating, DHW
10 - Cooling, DHW

11 - Ventilating, DHW

97 - None
99 - Other _____

016 97
017 ____
018 ____

Note: For the purposes of this question do not consider the use of the furnace fan to distribute ventilation air as an integrated mechanical system.

Comments: _____

_____

Space Heating System

020. to 057. The following table will provide a complete description of the space heating systems installed in the house. One primary and up to three secondary space heating systems may be described.

TABLE 1 SPACE HEATING SYSTEMS

Items A - D to be completed in the Office from HDF Items E - I to be completed at house	PRIMARY SPACE HEATING SYSTEM	SECONDARY SPACE HEATING SYSTEMS		
	SYSTEM 1	SYSTEM 2	SYSTEM 3	SYSTEM 4
A. Type	020 3	030 3	040	050
B. Manufacturer	021 CLARE	031 CLARE	041	051
C. Model	022 100 ODF	032 100 ODF	042	052
D. Fuel	023 34	033 34	043	053
E. Serial Number (not to be Data Captured)	001440	001428		
F. Output Capacity (kW) ***	024 99,000 BTU	034 99,000 BTU	044	054
G. Location of Appliance	025 FURNACE ROOM	035 FURNACE ROOM	045	055
H. Diameter of Combustion Air Inlet (inches)	026 7 IN	036 7 IN	046	056
I. Height above grade of the Combustion Air Inlet (feet)	027 7 FT	037 7 FT	047	057

*** Output capacity of a Furnace / Boiler, Heat Pump, Duct Heaters / Baseboard heaters all expressed in kW. Note: Btu/hr./3412 = _____kW.

Solar - CSI (Canadian Solar Industries) rating, expressed in GJ per year. Note that 1 GJ = 1000 MJ.

a) Place comments below, if the heating system is not the same as that outlined in the HDF.

b) Place comments below if the propane/gas heating system does not meet the Program criteria.

Comments: NOTE THAT FURNACES ARE OF REVERSE ACTION TYPE ONES

Comments (cont'd): _____

_____

_____

FOR OFFICE USE

A.	020	3	030	5	040		050
B.	021	CLOSE	031	CLOSE	041		051
C.	022	100 OCF	032	100 OCF	042		052
D.	023	34	033	34	043		053
F.	024	29.01 KW	034	29.01 KW	044		054
G.	025	40	035	40	045		055
H.	026	9 IN	036	9 IN	046		056
I.	027	9 PT	037	9 PT	047		057

CODE TABLES FOR ITEMS A, D, and G

A. Type

-1 - N/A

Electric Space Heating
1 - Baseboard/ hydronic/ plenum (duct) heater
2 - Forced-air furnace
3 - Heat pump
4 - Radiant

Gas/Propane Space Heating Furnace/Boiler
1 - Conventional with pilot
2 - Conventional with spark ignition
3 - Conventional with spark ignition and vent damper
4 - Induced draft fan
5 - Condensing and pulse

Oil Space Heating Furnace/Boiler
1 - Conventional
2 - Conventional with flue damper
3 - Conventional with flame retention head
4 - Mid-efficiency (no dilution air)
5 - Condensing (no chimney)

Wood/Solid Fuel Space Heating
1 - Airtight wood stove
2 - Airtight wood stove with catalytic converter
3 - Wood/solid fuel furnace
4 - Fireplace

Other Space Heating
1 - Solar Collector System

D. Fuel

31 - electric
32 - gas
33 - propane
34 - oil
35 - solar
36 - coal
37 - wood
38 - kerosene
99 - other

G. Location of Appliance

Heated Area	Unheated Area		
21 - Garage	31 - Garage	40 - Furnace Room	44 - Unpartitioned Basement
22 - Crawlspace	32 - Crawlspace	41 - Utility Room	57 - Throughout House
23 - Attic	33 - Attic	42 - Laundry Room	99 - Other _____

FOR OFFICE USE

COOLING/AIR CONDITIONING SYSTEM

060. Is there a cooling/air conditioning system in the house?

1 - Yes 2 - No 060 2

IF THERE IS NO COOLING/AIR CONDITIONING SYSTEM IN THE HOUSE, GO TO QUESTION 070.

061. to 066. The following table will provide a complete description of the cooling/ air conditioning systems installed in the house.

TABLE 2 COOLING/AIR CONDITIONING SYSTEMS

ITEM A to C to be completed in Office from HDF D to F to be completed at house	AIR CONDITIONING SYSTEM	
A. Type	061	061 _____
B. Manufacturer	062	062 _____
C. Model	063	063 _____
D. Cooling Capacity (kW) ***	064	064 _____
E. Number of Window Cooling Units	065	065 _____
F. Average Capacity of Window Units (kW)	066	066 _____

*** The units for air conditioning are expressed in kW. The conversion from other refrigeration measurements are:
Btu/hr. / 3412 = ____ kW tons / 0.29 = ____ kW

Note: Place comments below if the cooling system is not the same as that outlined in the HDF.

Comments: _____

_____

CODE TABLE FOR ITEM A.

A. Type

1 - Central conventional 2 - Central heat pump
3 - Window unit 4 - None

FOR OFFICE USE

Forced Air Distribution System

070. Does this house have a forced air heating system?

1 - Yes 2 - No 070 1

IF THIS HOUSE DOES NOT HAVE A FORCED AIR HEATING SYSTEM, GO TO QUESTION 075.

071. What provision has been made for sound dampening of the forced air heating system? (hot and cold air ductwork)

1 - flexible duct connectors
2 - duct liners
3 - duct liners & flexible connectors
97 - none
98 - unable to determine
99 - other _____

071 97

072. Has a central electronic air cleaner been installed?

1 - Yes 2 - No 072 2

073. Has a central humidifier been installed?

1 - Yes 2 - No 073 2

Comments: _____

_____

FOR OFFICE USE

Domestic Hot Water System

075. If the hot water heater is a combustion unit, does it share the same chimney with the space heating unit?

-1 N/A 1 - Yes 2 - No 075 -1

076. to 091. The following table will provide a complete description of the domestic hot water heating systems installed in the house. Up to two DHW systems may be described.

TABLE 3 DOMESTIC WATER HEATING SYSTEMS

ITEM A to D to be completed in Office from HDF E to G to be completed at house	PRIMARY HOT WATER HEATING SYSTEM SYSTEM 1	SECONDARY HOT WATER HEATING SYSTEMS SYSTEM 2
A. Type	076 1	086
B. Manufacturer	077 RHEEM	087
C. Model	078 TE30	088
D. Fuel	079 31	089
E. Serial Number (not to be data captured)		
F. Input Capacity (kW) ***	080 3000 BTU	090
G. If needed, has unit provision for Combustion Air?	081 -1	091

*** Input capacity of the Furnace / Boiler or Heat Pump expressed in kW. Note: Btu/hr./3412 = _____kW.

Solar - CSI (Canadian Solar Industries) rating, expressed in GJ per year. Note that 1 GJ = 1000 MJ.

a) Place comments below, if the domestic water heating system is not the same as that outlined in the HDF.

b) Place comments below if the propane/gas domestic water heating system does not meet the Program criteria.

Comments: NO RUNNING WATER, AS OF YET, SO C.W. IS NOT FUNCTIONING.

FOR OFFICE USE

A.	076	1	086	
B.	077	Kinetron	087	
C.	078	TE32	088	
D.	079	31	089	
F.	080	.87 Kw	090	
G.	081	-1	091	

CODE TABLES FOR ITEMS A, D, and G

A. Type

-1 - N/A

Electric Hot Water Heater
1 - tank
2 - heat pump system
3 - tankless coil
4 - instantaneous (point of use)

Gas/Propane Hot Water Heater
7 - conventional tank
8 - tankless coil
9 - instantaneous (point of use)
10 - induced draft fan
11 - direct vent (sealed)

Oil-Fired Hot Water Heater
5 - conventional tank
6 - tankless coil

Other Hot Water Heaters
12 - fireplace or wood stove water coil
13 - solar collector system

D. Fuel

31 - electric
32 - gas
33 - propane
34 - oil
35 - solar
36 - coal
37 - wood
38 - kerosene
99 - other

G. Combustion Air

-1 N/A 1 - Yes 2 - No

FOR OFFICE USE

VENTILATION SYSTEM

100. to 103. The following table will provide a complete description of the ventilation systems installed in the house.

TABLE 4 VENTILATION SYSTEM

ITEM A to C to be completed in Office from HDF D to F to be completed at house	VENTILATION SYSTEM
A. Type	100 1
B. Manufacturer	101 VAN EE
C. Model	102 2000/20
D. Serial Number	EW2338DH
E. Location of Unit	103 22

100 1

101 VAN EE

102 2000/20

103 22

Note: Place comments below if the ventilation system Is not the same as that outlined in the HDF.

Comments: _____

_____

CODE TABLE FOR ITEM A & E.

A. Type

1 - Heat Recovery Ventilator (HRV)
2 - Heat Pump
3 - Whole House Ventilator
99 - Other _____

E. Location of unit

	Heated Area	Unheated Area
1 - Basement	21 - Garage	31 - Garage
2 - Main (ground) Floor	22 - Crawlspace	32 - Crawlspace
3 - 2nd floor	23 - Attic	33 - Attic
	99 - Other _____	

FOR OFFICE USE

HRV SUPPLY AIR (FRESH AIR DISTRIBUTION)

105. Is there a fresh air outlet in the basement?

-1 N/A 1 - Yes 2 - No 105 1

106. If fresh air is distributed by the forced air heating system, does the furnace fan run continuously?

-1 N/A 1 - Yes 2 - No 106 1

107. Is the furnace fan multispeed?

-1 N/A 1 - Yes 2 - No 98 - unable to determine 107 1

108. Does the HRV system introduce fresh air within 12 inches of a return air intake of the forced air heating system?

-1 N/A 1 - Yes 2 - No 108 2

109. If this is a fuel-fired forced air heating system, is the return air opening(s) 6 feet away from the furnace?

-1 N/A 1 - Yes 2 - No 109 -1

AT THE VENTILATOR UNIT

111. Is there a flow measuring station (PBK) installed on the fresh/stale air duct?

-1 N/A 1 - Yes 2 - No 111 1

112. Is there a means for balancing the HRV?

-1 N/A 1 - Yes 2 - No 112 2

113. Is there insulation and a continuous vapour barrier on the HRV supply and exhaust air ducts, between the HRV and the exterior wall?

-1 N/A 1 - Yes 2 - No 98 - unable to determine 113 1

114. Are the joints on the HRV warm side supply air and exhaust air ducts taped?

-1 N/A 1 - Yes 2 - No 98 - unable to determine 114 1

115. Is a condensate hose installed?

-1 N/A 1 - Yes 2 - No 115 2

If you have answered "No" or "N/A" to any of these questions expand/explain with cross reference to the question number.

HRV NOT HOOKED-UP TO FURNACE COLD AIR RETURN.

FOR OFFICE USE

116. Are vibration mounts installed for the HRV?

-1 N/A 1 - Yes 2 - No 116 2

117. Are flexible connectors installed on the warm side of the HRV?

-1 N/A 1 - Yes 2 - No 117 2

118. If there are filters on the exhaust ductwork are they clean?

-1 N/A 1 - Yes 2 - No 118 1

119. Is the HRV marked to identify the need for regular cleaning of the air filters?

-1 N/A 1 - Yes 2 - No 119 2

120. Is the installer's name and/or phone number attached to the HRV?

-1 N/A 1 - Yes 2 - No 120 2

121. Does the mechanical system(s) appear to vibrate or make noise that travels to the living and sleeping areas of the house?

1 - Yes 2 - No 121 2

If you have answered "No" or "N/A" to any of these questions expand/explain with cross reference to the question number.

HRV NOT RUNNING CONTINUOUSLY SO NOT DOING IT'S JOB.

IF PERMANENTLY INSTALLED FLOW MEASURING STATIONS HAVE NOT BEEN INSTALLED IN THE HOUSE THEN USE THE PROCEDURE OUTLINED IN APPENDIX B OF THE MONITORING MANUAL, AND THEN FILL IN PAGE 13 WHICH IS ALSO USED WHEN FLOW MEASURING STATIONS ARE PERMANENTLY INSTALLED.

FOR OFFICE USE

VENTILATION RATES

125. & 126. Calculate the ventilation rate using the R-2000 Ventilation Requirements. For houses with an open floor plan count each defined area as a room (e.g. kitchen, dining room, living room is considered three rooms).

The required continuous ventilation rate is:

8 (No. of habitable rooms, bathrooms & kitchens) × 10 CFM + 1 (No. of basement & utility rooms) × 20 CFM = 100 (Continuous) CFM

125 100

The required capacity ventilation rate is:

100 (Continuous) CFM + 50 CFM (Additional) * = 150 (Capacity) CFM

126 150

MEASURED CONTINUOUS AND CAPACITY VENTILATION RATE

127. to 134. Measure the continuous and capacity ventilation rates at the stale-warm air and fresh-warm air points of the HRV and enter the results in the following table.

TABLE 5 MEASURED VENTILATION RATES

Measurement Point	Continuous Rate		Capacity Rate	
	Measured Velocity Pressure	CFM of Airflow	Measured Velocity Pressure	CFM of Airflow
Stale-warm air point 1	127 .145	129 190	131 -.16	133 200
Fresh-warm air point 4	128 .05	130 112	132 .08	134 141

127 .145
128 .05
129 190
130 112
131 .16
132 .08
133 200
134 141

If the air flows are not within 10% of each other, balance the system and repeat the tests.

136. Wind conditions at the time of the test?

1 - No Winds 2 - Light 3 - Strong
4 - Very Strong 5 - Gusts

136 5

137. Fresh air duct diameter at flow measuring station (inches): ____

137 6 IN

138. Stale air duct diameter at flow measuring station (inches): ____

138 6 IN

Note: Place comments below if the ventilation capacity Is not consistent with the capacity required in the Ventilation Report (HDF).

FOR OFFICE USE

Ventilation System Continued

HRV SUPPLY OUTLETS

140. Is there a fresh air outlet in each room?

-1 N/A 1 - Yes 2 - No 140 1

141. Has provision been made to minimize cool drafts from the fresh air supplies?

-1 N/A 1 - Yes 2 - No 141 1

HRV EXHAUST AIR (STALE AIR PICK-UP)

143. Is there a stale air pick-up in the basement?

-1 N/A 1 - Yes 2 - No 143 2

144. Is there a stale air pick-up for each floor other than the basement?

1 - Yes 2 - No 144 1

145. Is there a stale air pick-up in each bathroom?

-1 N/A 1 - Yes 2 - No 145 1

146. Is there a stale air pick-up in the kitchen?

-1 N/A 1 - Yes 2 - No 146 -1

147. Is the kitchen stale air pick-up at least 4 feet from the cooking surface?

-1 N/A 1 - Yes 2 - No 147 -1

KITCHEN RANGE HOOD

149. Is there a kitchen range hood?

1 - Yes 2 - No 149 2

150. Is the kitchen range hood a recirculating one?

-1 N/A 1 - Yes 2 - No 150 -1

If you have answered "No" or "N/A" to any of these questions expand/explain with cross reference to the question number.

FOR OFFICE USE

CLOTHES DRYER VENT

151. If the dryer vents to the indoors, are extra lint screens installed?

-1 N/A 1 - Yes 2 - No 151 -1

152. If the dryer vents indoors, is there a stale air pick-up within 10 feet?

-1 N/A 1 - Yes 2 - No 152 -1

If you have answered "No" or "N/A" to any of these questions expand/explain with cross reference to the question number.

_____

_____

_____

_____

HRV CONTROL

155. Does the ventilation system have provision for High Speed/Capacity operation?

1 - Yes 2 - No 155 1

IF THERE IS NO PROVISION FOR HIGH SPEED OPERATION, GO TO QUESTION 163.

156. to 161. Indicate below the types, location and numbers, of controls that regulate "low speed" to "high speed" operation of the ventilation equipment.

	CONTROL TYPE	LOCATION	NUMBER *	
156.	Manual high/low switch	_____	_____	156 _____
157.	Interval timer	_____	_____	157 _____
158.	Manual variable speed switch	UNIT	1	158 1
159.	Humidistat	_____	_____	159 _____
160.	Air quality sensor	_____	_____	160 _____
161.	Other: _____	_____	_____	161 _____

(Specify): _____

* Only "Number" to be data captured

FOR OFFICE USE

FAN EQUIPMENT

163. Are there any circulation, supply or HRV booster or exhaust fans in this house? Do not include dryers or vacuums.

1 - Yes 2 - No

163 2

IF THERE ARE NO FANS IN THIS HOUSE GO TO QUESTION 190.

164. to 183. Complete the following table to provide a description of supplementary fans, ie. booster, exhaust, circulation or supply fans.

TABLE 6 FAN EQUIPMENT

INFORMATION REQUIRED	FAN #1	FAN #2	FAN #3	FAN #4	FAN #5
A. Fan Type	164	168	172	176	180
B. Room the Fan is Located On	165	169	173	177	181
C. Fan Rating CFM (If known)	166	170	174	178	182
D. Type of Control	167	171	175	179	183

FOR OFFICE USE

164 ____	168 ____	172 ____	176 ____	180 ____
165 ____	169 ____	173 ____	177 ____	181 ____
166 ____	170 ____	174 ____	178 ____	182 ____
167 ____	171 ____	175 ____	179 ____	183 ____

CODES FOR ITEMS A, B, & D

A. Fan Type	B. Location of Fan	C. Control
1 - Booster	24 - Workshop	51- Manual high/low switch
2 - Supply	41 - Utility	52- Interval timer
3 - Exhaust	42 - Laundry	53- Manual variable speed switch
4 - Circulation	46 - Kitchen	54- Humidistat
	53 - Studio/Hobby	55- Air Quality sensor
	56 - Bathroom	99- Other
	99 - Other	

FOR OFFICE USE

FORCED AIR SUPPLY AND RETURNS

190. to 195. Indicate for the following zones of the house, the location of the cold air returns and the warm air outlets.

-1- N/A

1 - Most returns/outlets are at the ceiling/top of wall.

2 - Most returns/outlets are at the base of wall/floor.

3 - The returns/outlets are uniformly located at the ceiling/top of wall and at the base of wall/floor.

4 - No returns and/or outlets are located in this zone.

House Zone	Location of Cold Air Return	Location of Warm Air Supply
Basement Area	190	191
Living Area	192	193
Bedroom Area	194	195

190 -1
191 -1
192 3
193 3
194 3
195 3

If any of the supplies or returns are blocked, note this and their location. _____

OUTSIDE-HRV INLET & OUTLET

200. Are bird screens (1/4 x 1/4 inch) installed on all outside exhaust and intake duct openings?

-1 N/A 1 - Yes 2 - No 200 1

201. Are the bird screens clean?

-1 N/A 1 - Yes 2 - No 201 1

202. Is the air intake hood located away from possible pollution sources (e.g. car exhaust, side wall vents, etc.)?

-1 N/A 1 - Yes 2 - No 202 1

203. Are the exterior air intake and exhaust hoods at least 6 feet apart?

-1 N/A 1 - Yes 2 - No 203 1

204. Is the fresh air intake hood a minimum of 18" above grade and clearly identified?

-1 N/A 1 - Yes 2 - No 204 2

If you have answered "No" or "N/A" to any of these questions expand/explain with cross reference to the question number.

_____

_____

FOR OFFICE USE

Potential for Backdrafting Tests - Maximum House Depressurization

210. Does this home have a wood stove or fireplace?

1 - Yes 2 - No

210 2

IF THERE ARE NO WOOD STOVES OR FIREPLACES IN THIS HOME, GO TO QUESTION 280.

220. to 268. The following table will provide a complete description of the backdrafting of solid fuel fired combustion appliances.

Test by smoke pencil each solid fuel fired combustion appliance against each successive exhaust appliance which vents to the outdoors. Do in the order of exhaust devices shown. Enter "N" for No backdraft and or "Y" for Yes when a backdraft is experienced. Other boxes leave blank. See Appendix A of the Guidelines and Procedures Manual for the test procedure.

TABLE 7 BACKDRAFTING COMBUSTION APPLIANCES

Combustion Equipment		Exhaust Appliances								
Type of Solid Fuel Fired Appliance	Is there a combustion air Supply?	HRV on Low Speed 1	Furnace On Normal * 2	HRV on High Speed 3	HRV In Defrost 4	Bath Room Fan 5	Kitchen Fan Vented Outside 6	Clothes Dryer Vented Outside 7	Central Vacuum Vented Outside 8	Other specify 9
Fireplace In Basement	220	225	230	235	240	245	250	255	260	265
Fireplace on Main floor	221	226	231	236	241	246	251	256	261	266
Solid Fuel Space Heater	222	227	232	237	242	247	252	257	262	267
Other _____	223	228	233	238	243	248	253	258	263	268

* The furnace burners and continuous fan are on.

Comments: _____

_____

_____

_____

_____

FOR OFFICE USE

220___ 225___ 230___ 235___ 240___ 245___ 250___ 255___ 260___ 265___

221___ 226___ 231___ 236___ 241___ 246___ 251___ 256___ 261___ 266___

222___ 227___ 232___ 237___ 242___ 247___ 252___ 257___ 262___ 267___

223___ 228___ 233___ 238___ 243___ 248___ 253___ 258___ 263___ 268___

CODE TABLE

-1 N/A 1 - Yes 2 - No

FOR OFFICE USE

House Depressurization Test

The following test is to be performed on a limited number of homes as determined by the Program Authority.

270. Is this house to tested for depressurization due to exhaust equipment?

1 - Yes 2 - No 270 2

IF NO TEST IS TO BE PERFORMED, GO TO QUESTION 280.

272. to 275. Measure the pressure difference experienced across the house envelope as a result of operating exhaust equipment. See Appendix A of the Guidelines and Procedures Manual for the test procedure. This test provides an indication of compliance with the Program's new Technical Requirements.

TABLE 8 HOUSE DEPRESSURIZATION DUE TO EXHAUST EQUIPMENT

Equipment Operation	Indoor-Outdoor Pressure Measurement (Pa)	
all ventilation equipment and other exhaust appliances 'off'	272	272___
all equipment used for continuous ventilation 'on'	273	273___
** equipment or appliance that creates the highest intermittent air exhaust 'on'	274	274___
the exhaust appliances which caused backdrafting in Table 7	275	275___

** For an HRV with fan shut off and unbalanced airflow during the defrost mode of operation, operate either in defrost mode or block air intake during the test.

FOR OFFICE USE

Energy Meter Specifications

280. Does this home have separate energy meters installed?

1 - Yes 2 - No

280 2

IF NO ENERGY SUB-METERS ARE INSTALLED, GO TO QUESTION 343.

285. to 340. Complete the following table to provide a description of the energy meters installed in the house. Up to six meters may be described.

TABLE 9 ENERGY METER SPECIFICATIONS

Meter Number	1	2	3	4	5	6
A. Meter Function	285	295	305	315	325	335
B. Fuel	286	296	306	316	326	336
C. Units	287	297	307	317	327	337
D. Dials or Digits	288	298	308	318	328	338
E. Multiplier	289	299	309	319	329	339
F. Reading	290	300	310	320	330	340
G. Serial Number						

FOR OFFICE USE

285_____	295_____	305_____	315_____	325_____	335_____
286_____	296_____	306_____	316_____	326_____	336_____
287_____	297_____	307_____	317_____	327_____	337_____
288_____	298_____	308_____	318_____	328_____	338_____
289_____	299_____	309_____	319_____	329_____	339_____
290_____	300_____	310_____	320_____	330_____	340_____

CODE TABLES FOR ITEMS A, B, C AND D

A. Meter Function

0 - No Meter
11 - Primary Space Heating
12 - Primary Space Heating & Cooling
13 - Secondary Space Heating

Attached Areas Space Heating & Separate From Primary
14 - Garage
15 - Other Areas

16 - Central Air Conditioning
17 - Domestic Hot Water
18 - Primary Space Heating & DHW

21 - Total Metered Electrical Use
22 - Total Metered Gas Use

23 - Appliances &/or Lights
24 - Individually Metered Appliances and/or Fans, Pumps
25 - Heat Recovery Ventilator

B. Fuel Codes

31 - electric
32 - gas
33 - propane
34 - oil
35 - solar
36 - coal
37 - wood
38 - kerosene
99 - other

C. Unit of Measurement

51 - litre
52 - cubic metre
53 - kilogram
54 - joule
55 - kWh
67 - gallon
68 - cubic foot
69 - pound
72 - hour
71 - BTU

D. Dials or Digits

1 - dials 2 - digits

FOR OFFICE USE

Technician who completed this review:

Name: R. DOUGLAS MITCHELL
FIRST NAME, SURNAME

Signature: Doug Mitchell

343. Date: JAN 31/89
(MM DD YY)

343 _____

Time on Site Completing Questionnaire: 2 : 0
(hrs) (min)

Comments: H.R.V. NOT RUNNING AT ALL AND WHEN IF IT WERE TURN ONLY SUPPLIES FRESH AIR TO BASIC SPACE.

Energy, Mines and Resources Canada
Super Energy Efficient Home Program

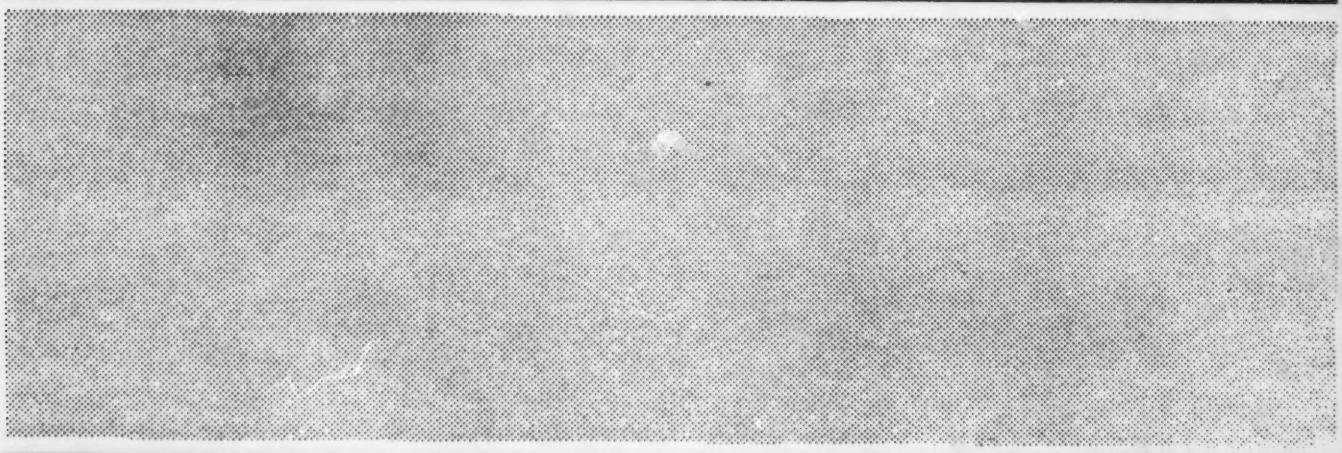
Énergie, Mines et Ressources Canada
Programme de la maison à haut rendement énergétique

House code

WOLLASTON LAKE
BAND OFFICE
THE HATCHET
LAKE BAND

R-2000

The Air Quality Report



Canada

Contents

Page	Section	Page	Section
1	Occupant Information	4	Formaldehyde Level Measurements
2	Floor Plan Sketch	6	Temperature & Humidity Tests
3	Radon Level Tests	7	Passive Air Change Test

Note: Refer to the Monitoring Manual for details on conducting the tests required in this report.

At the Office

Using the Builder Plans in the House Document Folder (HDF):

A - Provide a sketch of the house floor plan (photo reduce or draw),

B - Use the symbols provided in the Key for the floor plan,

C - Attach the floor plan to page 2 of the questionnaire,

D - For the passive air change test, use the house volume specified in HOTCAN.

At the House

A - Use an arrow to mark the orientation of the house on the floor plan.

A PHOTOCOPY OF THE HOUSE FLOOR PLAN SHOULD BE FORWARDED TO THE ONTARIO RESEARCH FOUNDATION (ORF) BY THE GT.

Occupant Information

Occupant Name: BOND (Surname), OFFICE (initial)

Mailing Address:

Street: WOLLASTON LAKE, SASK.

City: _____

Postal Code: SOJ 3CO

Telephone numbers:

Home: _____ _____

Work: 633 (area code) 2003 (number)

FLOOR PLAN SKETCH

A sketch of the floor plan should be provided below showing each floor on which air quality monitoring devices are located.

Identify the following: doors, windows, warm air, return air, HRV supply, HRV exhausts, stairs, floor drains, furnace, fireplace/woodstove, major furniture and cupboards.

KEY TO IDENTIFY SAMPLERS

□ Formaldehyde △ Radon ○ Source ⊗ Sampler

Note: Send a photocopy of this sketch of the floor plan to ORF. Do not detach this page from the Air Quality Report.

RADON LEVEL TESTS

1601 to 1608 The following table will provide information on the sources of radon/soil gas entry into the House when the house experiences negative pressures. With the house in winter operating condition, a negative pressure is created by turning on the clothes dryer if it is exterior vented. In its absence, the HRV is turned on high and the intake is blocked for the duration of the test.

-1 N/A 1 - Yes 2 - No

TABLE 1 POTENTIAL FOR RADON/SOIL GAS ENTRY INTO THE HOUSE: WHEN THE HOUSE IS UNDER NEGATIVE PRESSURE

Potential Source for Radon/Soil Gas Entry into House	During the test does the smoke pencil indicate gas entry? *		FOR OFFICE USE
Floor Drains as found	1601	-1	1601 -1
Floor Drains with Water added	1602	-1	1602 -1
Cracks in Basement Wall or Floor	1603	2	1603 2
Domestic Water Entry	1604	-1	1604 -1
Sewage Line leaving House	1605	-1	1605 -1
Sump Hole	1606	-1	1606 1
Other _____	1607		1607 _____
Other	1608		1608 _____

* Enter not applicable if source not tested.

Comments: _____

_____

RADON R.A.D. SURVEYMETER LABEL

Number #566 Start Date JAN 31/84

Location CRAWL SPACE Start Time [redacted] 10:00 AM

Comments: _____

_____

FOR OFFICE USE

FORMALDEHYDE LEVEL MEASUREMENTS

1610 During the time that the formaldehyde dosimeters are to be installed, will there be any smokers living in the house?

1 - Yes 2 - No 1610 1

1612 to 1616 The following table will provide information on the cabinetry in the house which could give off formaldehyde gas. Record the approximate linear feet of the upper and lower cabinets measured separately. Do not include any cupboards, vanities, etc. that are constructed entirely of solid wood.

TABLE 2 CUPBOARDS (Disregard solid wood)

Location/Type	Approximate Linear Feet	
Kitchen - Upper & Lower	1612	1612
Bathroom Counters	1613 4 ft	1613 4 ft
Other DESKS	1614	1614 50 ft
Other CABINETS	1615	1615 145 ft
Total	1616	1616

FOR OFFICE USE

LIVING ROOM FORMALDEHYDE DOSIMETER LABEL

Number #160 Start Date JAN 31/89

Location CHIEF'S OFFICE Start Time 10:00 AM

Comments: _____

_____

1617 to 1622 In the living room in which the formaldehyde dosimeter has been located, identify items which could significantly affect the formaldehyde readings. 1617 14

11 - new and/or newly upholstered furniture 1618 _____
12 - wall to wall carpets and/or rugs
13 - draperies 1619 _____
14 - cupboards
15 - wall panellings 1620 _____
16 - painting/ wall papering
97 - nothing 1621 _____
99 - Other _____ 1622 _____

Comments: _____

_____

BEDROOM FORMALDEHYDE DOSIMETER LABEL

Number #160 Start Date JAN 31/89

Location MAIN ROOM Start Time 10:00 AM.

Comments: _____

_____

1623 to 1628 In the bedroom in which the formaldehyde dosimeter has been located, identify items which could significantly affect the formaldehyde readings. 1623 14

11 - new and/or newly upholstered furniture 1624 _____
12 - wall to wall carpets and/or rugs
13 - draperies 1625 _____
14 - cupboards
15 - wall panellings 1626 _____
16 - painting/ wall papering
17 - near clothes closets 1627 _____
97 - nothing
99 - Other _____ 1628 _____

Comments: _____

_____

FOR OFFICE USE

TEMPERATURE AND HUMIDITY TESTS

1631 What device is used to measure humidity levels?

1 - Wet/Dry Bulb Thermometer 2 - Sling Psychrometer 1631 2

1632 What units of measurement are used for temperature?

1 - Celsius 2 - Fahrenheit 1632 2

1633 to 1658 The following table will provide a complete description of the temperatures and humidity levels in the house.

TABLE 3 OUTDOOR TEMPERATURE MEASUREMENT

Outdoor Dry Bulb Temperature	1633 -35°C

1633 -35°C

TABLE 4 INDOOR TEMPERATURE AND HUMIDITY MEASUREMENTS

Location: Zone	Wet Bulb Temp.	Dry Bulb Temp.	Relative Humidity
~~Basement~~ BSMT RM	55	1635 77	1636 22
~~Main~~ CHIEFS ~~Floor~~ OFFICE	53	1637 80	1638 22
~~Second~~ MAIN ~~Floor~~ ROOM	53	1639 75	1640 20
Third Floor	[illegible]	1641 [illegible]	1642
Other CRAWL SPACE	55	1643 77	1644 22

FOR OFFICE USE

1635 77 1636 22

1637 80 1638 22

1639 75 1640 20

1641 ____ 1642 ____

1643 77 1644 22

Comments _____

PASSIVE AIR CHANGE TEST

ORL/AIMS Data Sheet

House Code: |__| - |__|__|__|__| - |__|__|__|

HOUSE DESCRIPTION

_____ 1 story _____ 2 story _____ Split level

_____ W/basement _____ W/Fireplace _____ W/Woodstove

ZONE DESCRIPTION
-Divide the house into 2 zones.
Suggest using basement as zone 1. all other floors as zone 2.
- MUST CONSULT HOTCAN FOR VOLUME

	1.	2.
Vol. (m^3, ft^3)	_____	_____
Avg. Temp.(^oC)	_____	_____

METAL SOURCE

Deployed Time_____ am/pm ___/___/___ (MM/DD/YY)

Removed Time _____ am/pm ___/___/___ (MM/DD/YY)

NUMBER	Zone	Room	Floor	LOCATION Item Placed On	Comments
1_____	__1_	_____	____	_____	_____
2_____	__1_	_____	____	_____	_____
3_____	__2_	_____	____	_____	_____
4_____	__2_	_____	____	_____	_____

GLASS SAMPLER

Uncapped Time_____ am/pm ___/___/___ (MM/DD/YY)

Capped Time _____ am/pm ___/___/___ (MM/DD/YY)

NUMBER	Zone	Room	Floor	LOCATION Item Placed On	Comments
1_____	__1_	_____	____	_____	_____
2_____	__1_	_____	____	_____	_____
3_____	__2_	_____	____	_____	_____
4_____	__2_	_____	____	_____	_____

HOUSE FLOOR PLAN: A. Indicate zones
B. Indicate samples & source locations

Note: Send a photocopy of this page and a sketch of the floor plan to ORF. Do not detach this page from the Air Quality Report.

_____
GT PRINT NAME

Technician who completed this review:

FOR OFFICE USE

Name: R. Eduardo Mitchell
FIRST NAME, SURNAME

Signature: R. Eduardo Mitchell

1660. Date: JAN 31/89
(MM DD YY)

1660 _____

Time on Site Completing Questionnaire: ____:____
(hrs) (min)

Comments: _____

Energy, Mines and Resources Canada
Super Energy Efficient Home Program

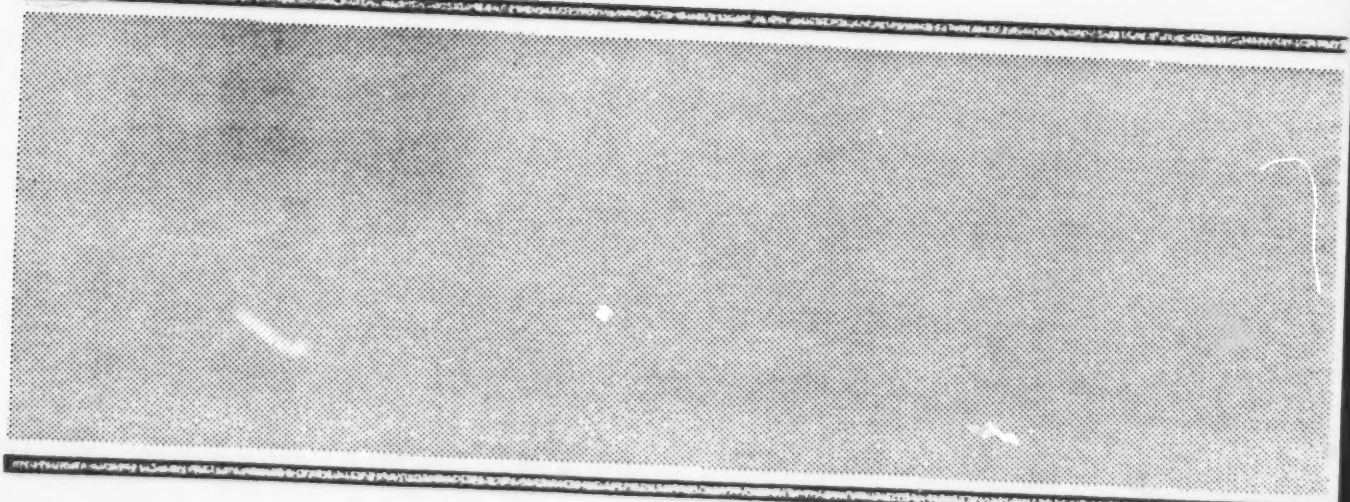
Énergie, Mines et Ressources Canada
Programme de la maison à haut rendement énergétique

House code

WOLLASTON LAKE
BAND OFFICE
THE HATCHET
LAKE BAND

R-2000

The Homeowner Survey



Canada

Contents

Page	Section	Page	Section
1	Occupant Information	5	Comparative Homeowner Information
3	Homeowner Information	6	Energy Consuming Appliances or Activities
4	R-2000 Homeowner Information	8	Air Quality Information

Note: The person being interviewed has been identified throughout this questionnaire as the Occupant. Another person who shares the responsibilities of the household is identified as the Spouse.

FOR OFFICE USE

Occupant Information

600. Occupant Name: BANG (Surname) , OFFICE (Initial) 600 _____

Mailing Address:

601. Street: THE WATCHET LAKE CONS 601 _____

602. City: WOLLASTON LAKE, SASK. 602 _____

603. Postal Code: S0J 3C0 603 _____

Telephone numbers of occupant & spouse:

Home: _____ _____

Work: 633 2003

Work: _____ _____
(Area Code) (Number)

Homeowner (if different from the occupant)

Name: _____

Address: _____

_____

Phone: _____

FOR OFFICE USE

604. What type of house is this?

1 - R-2000 Demo 2 - R-2000 ID or repeat 3 - Comparative — 604 1

605. Date the house was occupied: JUNE 1988 (MM DD YY) — 605 JUNE 1988

606. Is this the original occupant?

1 - Yes 2 - No — 606 1

607. Number of occupants over 18 years of age? 4 — 607 4

608. Number of occupants under 18 years of age? 2 — 608 2

609. How many occupants over 18 years of age remain home during the major portion of the working day? ____ — 609 4

610. How many occupants under 18 years of age remain home during the major portion of the working day? ____ — 610 2

611. Is the occupant the:

1 - owner 2 - renter 3 - owner/builder — 611 3

612. What is the approximate age of the occupant?

1 - 18-30 2 - 31-45 3 - 46-60 4 - over 60 — 612 2

613. What is the approximate age of the spouse?

-1 N/A 1 - 18-30 2 - 31-45 3 - 46-60 4 - over 60 — 613 -1

614. to 615. What are the primary occupations of the occupant and the spouse?

614. Occupant 15 615. Spouse -1

-1 - N/A
10 - Professional
11 - Manager/Admin.
12 - Technical
13 - Sales
14 - Clerical
15 - Trades
16 - Homemaker
17 - Student
18 - Retired
99 - Other _____

614 15
615 -1

616. What was the occupants previous residence?

1 - an apartment 2 - a row home
3 - a semi-detached home 4 - a detached home — 616 4

617. Did the occupants own or rent their previous residence?

-1 - N/A 1 - owned 2 - rented — 617 -1

FOR OFFICE USE

618. to 620. If the occupant rented their previous residence, how did they pay for the following utilities?

-1 - N/A
1 - paid directly
2 - included in rent
98 - don't know

618. Space Heating _____ 618 -1

619. Water Heating _____ 619 -1

620. Lights and Appliances _____ 620 -1

621. Was this house built as a custom home for the present homeowner?

1 - Yes 2 - No 98 - don't know 621 1

Note: A custom home is a home that the homeowner ordered built and had input to the basic design and/or construction techniques.

622. to 623. What does the occupant feel will happen to energy prices in the future?

1 - increase 2 - remain constant 3 - decrease 98 - don't know

622. over the next 5 years _____ 622 1

623. over the next 10 years _____ 623 1

IF THE OCCUPANT RENTS THE RESIDENCE GO TO QUESTION 663.

Homeowner Information

625. For how many years do the occupants expect to own their home?

1 - 5 years or less
2 - 6 to 10 years
3 - 11 to 15 years
4 - more than 15 years
98 - don't know

625 4

626. What was the purchase price of the home, excluding the price of the land? $160,000.00 626 $160,000.00

627. Was the homeowner aware of the R-2000 Program before they purchased their home?

1 - Yes 2 - No 627 1

628. If the homeowner decided to purchase another home, would they consider the purchase of an R-2000 home?

1 - Yes 2 - No 98 - don't know 628 1

If the home occupant answered NO to question 628, place the reason in the comment section below.

_____

_____

FOR OFFICE USE

629. to 638. At the time the homeowner purchased the home, how important were the following factors?

1 - not considered at all
2 - not important
3 - somewhat important
4 - extremely important

629. location	_____	629 2
630. size and design of home	_____	630 3
631. total cost	_____	631 2
632. downpayment	_____	632 2
633. energy costs	_____	633 4
634. monthly principal, interest & taxes	_____	634 2
635. solar orientation	_____	635 3
636. view	_____	636 3
637. maintenance	_____	637 3
638. resale value	_____	638 2

IF THE HOME IS A COMPARATIVE HOME, GO TO QUESTION 660.

R-2000 Homeowner Information

640. Did the homeowner pay extra for the energy efficient features of the home?

1 - Yes 2 - No 98 - Don't know 640 2

641. If the homeowner did pay extra for the energy efficient features of the home, over what period of time do they expect to recover the extra purchase price?

1 - 2 years or less
2 - 3 to 5 years
3 - 6 to 10 years
4 - more than 10 years
5 - never
6 - don't know

641 -1

642. Did the homeowner calculate the anticipated monthly energy costs in assessing the affordability of the home?
-1 - N/A 1 - Yes 2 - No 642 2

643. What importance did the financial institution with which the homeowner deals, place upon the energy aspect of their new home?

-1 - N/A
1 - not considered at all
2 - not important
3 - somewhat important
4 - extremely important
98 - don't know

643 -1

FOR OFFICE USE

644. to 653. In addition to energy, does the homeowner feel there are other advantages or disadvantages to living in an R-2000 home? (do not prompt)

Advantages (644-648)

97 - none
11 - constant temperature
12 - quieter
13 - no drafts
14 - warmer
15 - fresh air
16 - humidity control
17 - less dust
18 - less moisture
99 - Other (Specify)_____

644 11
645 13
646 13
647 14
648 16

Disadvantages (649-653)

649 97

97 - none
21 - HRV noise
22 - stale air
23 - loud furnace
24 - air too dry
25 - high humidity
26 - overheating
27 - cold basements
28 - higher electrical costs
99 - Other (Specify)_____

650 _____
651 _____
652 _____
653 _____

654. Which information source initially lead the homeowner to purchase an R-2000 home?

1 - builder advertising
2 - government information
3 - newspaper/magazine articles
4 - TV advertising/features
5 - friends
6 - real estate agents
98 - don't know
99 - other:_____

654 2

655. How many friends of the occupant, who are purchasing/building a home, have become interested in the R-2000 Program? _____ 655 -1

656. to 657. What influence did the participation of the Canadian government and/or the Canadian Home Builders Association have on the homeowners decision to buy an R-2000 home?

1 - negative influence
2 - no influence
3 - positive influence

CHBA 2
Government 3

656 2
657 3

IF THIS IS AN R-2000 HOME, GO TO QUESTION 663.

Comparative Homeowner Information

660. to 662. What factors lead the homeowner to purchase this home rather than an R-2000 home?

1 - additional cost of R-2000 house
2 - design
3 - site location
4 - view
5 - unsure of technology
6 - lack of awareness
99- Other:_____

660 _____
661 _____
662 _____

FOR OFFICE USE

Energy Consuming Appliances or Activities

663. At the time of purchasing the household appliances, was the occupant aware of the 'Energuide' rating program for appliances?

-1 - N/A 1 - Yes 2 - No 663 -1

668. to 679. What importance did the occupant place upon energy efficiency at the time of purchasing the following appliances? Enter in the table below.

-1 - N/A
1 - not considered at all 2 - not important
3 - somewhat important 4 - extremely important

Range (oven/stove)		668 -1
Stove top		669 -1
Oven (separate)		670 -1
Convection oven		671 -1
Microwave oven		672 -1
Refrigerator		673 -1
Freezer		674 -1
Dishwasher		675 -1
Clothes washer		676 -1
Clothes dryer		677 -1
Other _____		678 _____
Other _____		679 _____

FOR OFFICE USE

681. to 685. List the features inside the home which contribute to increased energy consumption.

97 - none
21 - well pump
22 - sump pump
23 - sauna
24 - workshop
25 - indoor pool
26 - whirlpools
27 - energy intensive hobbies
28 - garbage compactor/shredder
29 - central vacuum
30 - open windows/doors
99 - Other _____

681 97
682 _____
683 _____
684 _____
685 _____

687. to 691. List the features outside the home which contribute to increased energy consumption.

97 - none
32 - outdoor pool
33 - electric gardening tools
34 - yard lighting
35 - separate workshop
36 - heated walk/driveway
99 - Other _____

687 97
688 _____
689 _____
690 _____
691 _____

692. Does the occupant use a block heater?

1 - Yes 2 - No

692 1

695. If the occupant uses a vehicle block heater, calculate the total hours per year the block heater is used. Otherwise, enter -1 for Not Applicable.

_____ hrs/day X _____ No. of vehicles X _____ days/yr = _____ total hrs/yr

695 -1

696. Since the home has been occupied, are there areas attached to the home which were not previously heated, and are now heated?

97 - none
3 - addition
99 - Other _____
21 - garage
54 - sunspace

696 97

FOR OFFICE USE

Air Quality Information

700. Does the occupant have any concerns regarding the air quality in the home?
1 - Yes 2 - No

700 2

IF THE ANSWER TO QUESTION 700 WAS YES, COMPLETE QUESTIONS 701 TO 724, OTHERWISE GO TO QUESTION 725.

701. to 724. Identify any air quality concern(s) by indicating whether or not the following occurs during the summer and/or winter. Do not prompt the occupant.

1 - minor problem
2 - moderate problem
3 - severe problem
9 - no problem

	Summer	Winter	FOR OFFICE USE
Moisture/humidity (701-712)			701 97 702 97
window panes, sills and trim	701 97	702 97	703 97 704 97
mildew in room ceiling corners	703 97	704 97	705 97 706 97
sensory perception of moisture	705 97	706 97	707 97 708 97
warped or swollen doors	707 97	708 97	709 97 710 97
damp basement floors or walls	709 97	710 97	711 ____ 712 ____
other: _____	711 ____	712 ____	
Comments: _____			
Odours (713-718)			713 97 714 97
in the kitchen	713 97	714 97	715 97 716 97
in the bathroom	715 97	716 97	717 ____ 718 ____
other: _____	717 ____	718 ____	
Comments: _____			
Dry Static Air (719-724)			719 97 720 97
sensory perception (eg. dry throat)	719 97	720 97	721 97 722 97
static electricity	721 97	722 97	723 ____ 724 ____
other: _____	723 ____	724 ____	
Comments: _____			

FOR OFFICE USE

725. Approximately how many cigarettes are smoked in the home per day? 1 1/2 packs — 725 1 1/2 packs

726. Are any pipes or cigars smoked in the home?

1 - Yes 2 - No — 726 2

727. Approximately how many plants are in the home? 0 — 727 0

728. Approximately how many of these are spider plants? ___ — 728 0

Note: spider plants have the ability to absorb certain amounts of formaldehyde from the air.

729. to 732. List the occupant's hobbies that could effect the air quality in the home?

97 - none
41 - pottery/crafts
42 - wood working
43 - mechanical work
44 - oil painting
45 - beer/wine making
46 - furniture refinishing
99 - other (specify) _____

729 97
730 _____
731 _____
732 _____

735. to 740. Prior to moving into the home, were any members of the family sensitive to the following problems? Indicate these below.

(Enter 1 - Yes or 2 - No).

	Adults	Children
Allergies	735 2	736 2
Asthma	737 2	738 2
Other: _____	739 _____	740 _____

735 2
736 2
737 2
738 2
739 _____
740 _____

741. What is the source for water used in this house?

1 - municipal water
2 - homeowner spring or surface well
3 - homeowner well deeper than 25 feet
99 - other

741 99

742. Where does the clothes dryer vent?

-1- N/A
1 - indoors
2 - outdoors
3 - indoors in winter/outdoors in summer
4- directly to the HRV

742 -1

FOR OFFICE USE

745. to 752. How often does the occupant operate the following equipment?

-1 = N/A
1 = continuously
2 = intermittantly
3 = never used

745. humidifier in winter	_____	745 -1
746. dehumidifier in summer	_____	746 -1
747. electronic air cleaning equipment	_____	747 -1
748. HRV in the summer	_____	748 2
749. HRV in the winter	_____	749 2
750. furnace blower - in winter	_____	750 1
751. furnace blower - in summer	_____	751 2
752. air conditioning	_____	752 -1

753. to 754. Has a manual been provided for the operation and maintenance of the ventilation and heating system(s)?

-1 = N/A 1 = Yes 2 = No

753. ventilation system	_____	753 1
754. heating system	_____	754 1

755. to 760. Is the occupant aware of the need to perform the following mechanical system maintenance?

-1 = N/A 1 = Yes 2 = No

755. clean the HRV filters	_____	755 2
756. clean the HRV core	_____	756 2
757. check the HRV intake hood	_____	757 2
758. adjust the humidistat setting	_____	758 2
759. change the furnace filter	_____	759 2
760. clean the electronic air cleaner	_____	760 -1

Note: If the occupant answers no to any of the above questions, impress upon the homeowner the importance of regular equipment maintenance in terms of air quality, equipment longevity and energy savings. Ask them to refer to the appropriate manuals regarding operation and maintenance.

FOR OFFICE USE

761. Has a member of your family received instructions on how to read the energy meters and send in the monthly meter reading cards?

-1 - N/A 1 - Yes 2 - No 761 2

Note: If the occupant has not received instructions on reading the energy meters and completing the monthly cards, proceed to provide instructions. If instructions have already been provided the GT should determine if any difficulties are being encountered in the meter reading, and try to resolve the problem(s).

762. Does the occupant have any comments on the ventilation system?

Comments: OCCUPANT IS TOTALLY UNAWARE OF HRV OPERATION + MAINTENANCE.

Technician who completed this review:

Name: R. CRAIG MITCHELL
FIRST NAME, SURNAME

Signature: [signature]

765. Date: JAN 31/90 763 ____
(MM DD YY)

Time on Site Completing Questionnaire: 2 : 0
(hrs) (min)

Comments: _____

APPENDIX I

Project Summary
R-2000 Band Office, Wollaston Lake, Saskatchewan
Stage 1, Construction

After nearly a years delay, the stage 1 construction phase of this project is complete.

Thanks to a visit from Doug Mitchell of Energy, Mines and Resources Canada, in September 1986, the air/vapour barrier was properly installed as per Annex "A" of the Contribution Agreement.
The basement walls were constructed of 2" x 6" pressure treated lumber instead of 2" x 8" as per the specifations. This was due to the inadvertent loss of the 2" x 8" to another job site.
As per the Contribution Agreement; the attic is insulated to R60 the walls to R 27.5 but because of 2" x 6" instead of 2"x 8" the foundation is insulated to R20.

The furnaces included retention headburners.

The ventilation is provided by a heat Recovery Ventilator.

Windows are triple glazed and wooden framed.
Exterior doors are insulated metal clad.
Battery powered set back thermostats will be used.
A flow meter is installed on the oil line and an electrical meter will be installed on the domestic hot water tank when sewer and water are connected.
Construction costs were 159,138.61 which is under the original estimate of $160,000.00.

Energy related benifits are already apparent since temporary heat has been easily providing sufficient warmth for construction.
The only two real problems were the time delay and air/vapour barrier detailing, both of which have subseguently been resolved.

Councilor/Manager
Hatchet Lake Band